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Striker Striker & Stenby
103 East Neck Road
Huntington, NY 11743

04/25/2011

EXAMINER

KIM, HEE-YONG

ART UNIT	PAPER NUMBER
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2482

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/587,638	Applicant(s) ERSUE ET AL.	
	Examiner HEE-YONG KIM	Art Unit 2482	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-32 and 34-37 is/are rejected.
- 7) ☒ Claim(s) 33 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This office action is in reply to Applicant's Response dated March 2, 2011.
2. **Claims 1-18** have been cancelled.
3. **Claims 19-37** have been newly added.
4. **Claims 19-37** are pending.

Response to Arguments

5. Applicant's arguments with respect to the prior art rejection over **claims 19-37** have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 19-22** are rejected under 35 U.S.C. 102(b) as being anticipated by Buckley (US 6,064,759), hereafter referenced as Buckley.

Regarding **claim 19**, Buckley discloses Computer Aided Inspection Machine. Buckley specifically discloses A method of determining one or more areas to be inspected on a surface of a three-dimensional object based on design data available in

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electronic form relating to the three-dimensional object (Fig.1), said method comprising the steps of:

- a) automatically determining at least one area on said surface of said three-dimensional object to be inspected with an arithmetic logic unit (computer aided inspection, col.1, line 61) based on said design data in said electronic form related to said three-dimensional object (Analyze the objects' geometrical model and determine by simulation which surface or edge points are required for inspection, col.2, line 51-56);
- b) automatically determining at least one other area on said surface of said three-dimensional object that is not to be inspected with said arithmetic logic unit based on said design data in said electronic form related to said three-dimensional object (eliminating both pixel acquired and the pixels analyzed to just those which contribute to determining the parts dimensions, col.5, line 14-21) ;
- c) automatically determining a respective manner (only one third of data needs to be taken, col.8, line 51-53) in which each of said at least one area on said surface of said three-dimensional object is to be inspected; and
- d) assigning said at least one area on said surface of said three-dimensional object to be inspected to pictures that were actually taken with an optical picture-taking device during an inspection with said optical picture-taking device (uses graphical image of the scanned object to identify the primitive surface or object, col.4, line 6-8).

Regarding **claim 20**, Buckley discloses everything claimed as applied above (see claim 19). Buckley further discloses wherein said design data is CAD data (CAD uses geometrical model, col.1, line 51) or is determined by a sensor.

Regarding **claim 21**, Buckley discloses everything claimed as applied above (see claim 19). Buckley further discloses wherein said at least one area on said surface of said three-dimensional object to be inspected is electronically stored (geometric model computer files, col.1, line 64-65) or visualized as a calculated picture.

Regarding **claim 22**, Buckley discloses everything claimed as applied above (see claim 21). Buckley further discloses wherein said at least one area on said surface of said three-dimensional object to be inspected in said respective manner automatically based on said design data is capable of being processed manually (uses mouse cursor, col.32, line 16).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. **Claims 23-24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckley in view of Welsh (US 4,970,666), hereafter referenced as Welsh.

Regarding **claim 23**, Buckley discloses everything claimed as applied above (see claim 22). However, Buckley fails to disclose wherein further comprising displaying said calculated picture of said at least one area on said surface of said three-dimensional object to be inspected in said pictures that were actually taken during said inspection.

In the similar field of endeavor, Welsh discloses Computerized Video Imaging System for Creating a Realistic Depiction of a Simulated Object in an Actual Environment. Albeck specifically discloses wherein further comprising displaying said calculated picture of said at least one area on said surface of said three-dimensional object to be inspected in said pictures that were actually taken during said inspection (Superimposing CAD verification model onto Image at Corresponding coordinates. col.28, line 58-65), in order to ascertain the accuracy of site data (col.28, line 58-65).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Buckley by providing specifically Superimposing CAD verification model of the areas to be inspected onto the captured image, in order to ascertain the accuracy of inspected parts. The Buckley Computer Aided Inspection Machine, incorporating the Welsh Superimposing CAD verification model of the areas to be inspected onto the captured image, has all the features of claim 23.

Regarding **claim 24**, the Buckley Computer Aided Inspection Machine, incorporating the Welsh Superimposing CAD verification model of the areas to be inspected onto the captured image, as applied to claim 23, teaches further comprising automatically comparing features (Superimposing CAD verification model onto Image at Corresponding coordinates. col.28, line 58-65) in said at least one area on said surface of said three-dimensional object to be inspected in said respective manner based on said design data with features recognizable in said pictures that were actually taken during said inspection, and then carrying out a position correction, based on

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results of the comparing (correcting site data to ensure registration, col.28, line 58-65), if necessary.

10. **Claims 25-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckley in view of Welsh, further in view of Pryor (US 5,706,408), hereafter referenced as Pryor.

Regarding **claim 25**, Buckley and Welsh disclose everything claimed as above (see claim 25). However, Buckley and Welsh fail to disclose further comprising three-dimensionally calibrating said optical picture-taking device.

In the analogous field of endeavor, Pryor discloses Target Based Determination of Robot and Sensor Alignment. Pryor specifically discloses three-dimensionally calibrating said optical picture-taking device (the sensor units are calibrated automatically relative to math data base of CAD, col.2, line 31-43), in order to position robot accurately (col.2, line 21-29).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Buckley and Welsh by providing specifically calibrating optical sensor relative to CAD model, in order to position robot accurately. The Buckley Computer Aided Inspection Machine, incorporating the Welsh Superimposing CAD verification model of the areas to be inspected onto the captured image, further incorporating the Pryor calibrating optical sensor relative to CAD model, has all the features of claim 25.

Regarding **claim 26**, the Buckley Computer Aided Inspection Machine, incorporating the Welsh Superimposing CAD verification model of the areas to be inspected onto the captured image, further incorporating the Pryor calibrating optical sensor relative to CAD model, as applied to claim 25, teaches further comprising a fine-positioning (Pryor: sensor units look at these positions, col.2, line 31-43) of said three-dimensional object in said pictures that were actually taken.

11. **Claims 27-29, 31- 32 and 34-37** are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckley in view of Welsh, further in view of Rankin (US 2002/0,169,586), hereafter referenced as Rankin.

Regarding **claim 27**, Buckley and Welsh discloses everything claimed as applied above (see claim 19). However, Buckley and Welsh fail to disclose further comprising moving said optical picture-taking device and said three-dimensional object relative to each other with a displacement device, planning an inspection path for said optical picture-taking device for inspection of said three-dimensional object based on said design data for said three- dimensional object or said at least one area to be inspected on said surface of said three-dimensional object and based on optical imaging characteristics of said optical picture-taking device, stored in an electronic form, and by using an arithmetic logic unit said inspection path for said optical picture-taking device is automatically determined by specifying a predetermined geometric relationship between said optical picture-taking device and said surface on said three-dimensional object to be inspected.

In the analogous field of endeavor, Rankin discloses Automated CAD Guided Sensor Planning Process. Specifically Rankin discloses further comprising moving said optical picture-taking device and said three-dimensional object relative to each other with a displacement device (CMM or Robot, paragraph 21), planning an inspection path (CAD-guided sensor path planning system, paragraph 33) for said optical picture-taking device for inspection of said three-dimensional object based on said design data for said three-dimensional object or said at least one area to be inspected on said surface of said three-dimensional object and based on optical imaging characteristics (resolution, field of view, focal length, paragraph 20) of said optical picture-taking device, stored in an electronic form, and by using an arithmetic logic unit said inspection path for said optical picture-taking device is automatically determined (sensor planner automatically determines various viewing positions and orientations, paragraph 10) by specifying a predetermined geometric relationship (orient sensor with respect to the direction of view, paragraph 29) between said optical picture-taking device and said surface on said three-dimensional object to be inspected, in order to automatically determine the sensor viewing positions and orientations to allow the entire surface of the part to be efficiently measured(par.21).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Buckley and Welsh by providing specifically CAD-guided sensor planning, in order to automatically determine the sensor viewing positions and orientations to allow the entire surface of the part to be efficiently measured. The Buckley Computer Aided Inspection Machine, incorporating the Welsh

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Superimposing CAD verification model of the areas to be inspected onto the captured image, further incorporating the Rankin CAD-guided sensor path planning system, has all the features of claim 27.

Regarding **claim 28**, Buckley and Welsh and Rankin discloses everything claimed as applied above (see claim 27). Buckley further discloses further comprising guiding said optical picture-taking device over said three-dimensional object, and wherein said three-dimensional object is either stationary or moving (Fig.1).

Regarding **claim 29**, The Buckley Computer Aided Inspection Machine, incorporating the Welsh Superimposing CAD verification model of the areas to be inspected onto the captured image, further incorporating the Rankin CAD-guided sensor path planning system, as applied to claim 28, discloses further comprising determining picture-taking positions (Rankin: sensor planner automatically determines various viewing positions and orientations, paragraph 10) of the optical picture-taking device so as to cover said three-dimensional object (Rankin: entire surfaces of the part to be measured, paragraph 21) or said at least one area on said surface of said three-dimensional object to be inspected with said pictures that were actually taken during said inspection.

Regarding **claim 31**, The Buckley Computer Aided Inspection Machine, incorporating the Welsh Superimposing CAD verification model of the areas to be inspected onto the captured image, further incorporating the Rankin CAD-guided sensor path planning system, as applied to claim 27, discloses further comprising assigning an illumination device (Buckley: light source 3, Fig.1) to said optical picture-taking device

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and determining said inspection path by specifying a specific geometric relationship (Rankin: sensor planner automatically determines various viewing positions and orientations, paragraph 10) between said optical picture-taking device, said illumination device, and said surface on said three-dimensional object to be inspected.

Regarding **claim 32**, the Buckley Computer Aided Inspection Machine, incorporating the Welsh Superimposing CAD verification model of the areas to be inspected onto the captured image, further incorporating the Rankin CAD-guided sensor path planning system, as applied to claim 31, discloses further comprising determining a motion sequence for relative motion between said three-dimensional object and said optical picture-taking device (Rankin: appropriately position sensor in accordance with determined viewing positions and orientations, paragraph 21) or said illumination device for the optical picture-taking device from said inspection path.

Regarding **claim 34**, the Buckley Computer Aided Inspection Machine, incorporating the Welsh Superimposing CAD verification model of the areas to be inspected onto the captured image, further incorporating the Rankin CAD-guided sensor path planning system, as applied to claim 27, discloses wherein said at least one area on said surface of said three-dimensional object to be inspected with a specified picture is assigned (uses graphical image of the scanned object to identify the primitive surface or object, col.4, line 6-8) to each of said pictures actually taken with said optical picture-taking device during said inspection.

Regarding **claim 35**, the Buckley Computer Aided Inspection Machine, incorporating the Welsh Superimposing CAD verification model of the areas to be

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inspected onto the captured image, further incorporating the Rankin CAD-guided sensor path planning system, as applied to claim 27, discloses further comprising performing a check, based on said at least one area on said surface of said three-dimensional object to be inspected and said inspection path, to determine whether said three-dimensional object defined by said design data or an entire area of said surface to be inspected on said three-dimensional object defined by said design data, has been completely covered (Rankin: Fig.2: automated CAD-guided sensor planning).

Regarding **claim 36**, the Buckley Computer Aided Inspection Machine, incorporating the Welsh Superimposing CAD verification model of the areas to be inspected onto the captured image, further incorporating the Rankin CAD-guided sensor path planning system, as applied to claim 27, discloses further comprising visualizing said inspection path or said at least one area defined on said surface of said three-dimensional object to be inspected on display means (Welsh: Superimposing CAD verification model onto Image at Corresponding coordinates. col.28, line 58-65).

Regarding **claim 37**, the Buckley Computer Aided Inspection Machine, incorporating the Welsh Superimposing CAD verification model of the areas to be inspected onto the captured image, further incorporating the Rankin CAD-guided sensor path planning system, as applied to claim 36, discloses wherein said display means is a display device (Welsh: Analog RGB Monitor 41, Fig.6A).

12. **Claim 30** is rejected under 35 U.S.C. 103(a) as being unpatentable over Buckley in view of Welsh, further in view of Rankin, and further in view of Albeck (US 6,167,151), hereafter referenced as Albeck.

Regarding **claim 30**, Buckley and Welsh and Rankin disclose everything claimed as applied above (see claim 29). However, Buckley and Welsh and Rankin fail to disclose wherein points in time for taking pictures are determined with consideration for displacement information of the displacement device and the picture- taking positions of the picture-taking device.

In the similar field of endeavor, Albeck discloses Apparatus and Method for 3-dimensional Surface Geometry Reconstruction. Albeck specifically teaches wherein points in time for taking pictures are determined (Examiner read as picture should be taken when the displacement position correspond to planned viewing position) with consideration for displacement information of the displacement device (Object assembly 44, mast 33, Fig.1) and the picture- taking positions of the picture-taking device (optical head 30, Fig.1), in order to allow overlapping portions of the object of interest to be imaged in a predetermined sequence (col.5, line 16-23).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Buckley and Welsh and Rankin by providing specifically displacement devices (Object assembly 44 and mast 33) and taking picture when the displacement position correspond to planned viewing position, *in order to allow overlapping portions of the object of interest to be imaged in a predetermined sequence.* The Buckley Computer Aided Inspection Machine,

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incorporating the Welsh Superimposing CAD verification model of the areas to be inspected onto the captured image, further incorporating the Rankin CAD-guided sensor path planning system, further incorporating the Albeck displacement devices (Object assembly 44 and mast 33) and taking picture when the displacement position correspond to planned viewing position, has all the features of claim 30.

Allowable Subject Matter

13. **Claim 33** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim 27 (for claim 3) and intervening claim 31 and 32.

Dependent **claims 33** has features "...determining a motion sequence for relative motion between said three- dimensional object and said optical picture-taking device or said illumination device for the optical picture-taking device from said inspection path, and keeping said inspection path or an inspection time as short as possible when said motion sequence is determined..." which are features that are not anticipated nor obvious over the art of record. Accordingly, if the claims are amended as indicated above, and if rejected claims 1-32 and 34-37 are cancelled, the application would be placed in a condition for allowance.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE-YONG KIM whose telephone number is (571)270-3669. The examiner can normally be reached on Monday-Thursday, 8:00am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Kelley can be reached on 571-272-7331. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/HEE-YONG KIM/
Examiner, Art Unit 2482

/Andy S. Rao/
Primary Examiner, Art Unit 2486
April 21, 2011